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A process for the automatic monitoring by a computer of the attainment of training targets

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Abstract

The invention relates to a process (1) for the automatic monitoring by a computer of the attainment of training targets by a trainee (3) in the framework of a training course comprising at least one training unit. To further develop such a process (1) so as to increase the efficiency of the training course, the invention proposes a process (1) comprising the following steps:

- selection of questions from a group of questions (2),
- creation of a control test by assembling the selected questions (5),
- the making available of the control test to the trainee (3) (7),
- recording of the answers of the trainee (3) to the questions of the control test (8),
- comparison of the answers with given requirements (9),
- creation of an additional training unit (11) if the demanded requirements have not been attained and
- the making available of the additional training unit to the trainee (3) (12).

AUSTRALIA

Patents Act 1990

**ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT**

Invention Title: 'A process for the automatic monitoring by a computer of the attainment of training targets'

The following statement is a full description of this invention, including the best method of performing it known to us:

A Process for the Automatic Monitoring by a Computer of the Attainment of Training Targets

Field of the invention

The present invention relates to a process for the automatic monitoring by a computer of
5 the attainment of training targets by a trainee in the framework of a training course comprising
at least one training unit.

The present invention further relates to a computer for automatically monitoring the
attainment of training targets by a trainee in the framework of a training course comprising at
least one training unit.

10 Background of the invention

The computer in which such a process is implemented is generally a microcomputer, in
particular a personal computer (PC). A process of the above mentioned type is also referred to
as computer-assisted learning or computer-based training (CBT). CBT is the generic term for
interactively imparting knowledge by means of a computer. From the prior art a CBT process is
15 known which operates off-line and which, from a local storage medium, for example a CD-
ROM, makes the training units of the training course available to the trainee on a display unit of
the computer for study purposes. However, CBT processes are also known which utilize the
facilities of modern computer networks, for example an in-house intranet or the world-wide
internet, to present the training units of the training course. In the CBT processes which operate
20 using computer networks, a specific computer in the computer network, the so-called server, is
accessed by the trainee via his computer by means of the computer network. The training units
of the training courses, the training environment, and functions for the management of the
training courses are stored in the server.

In the known CBT processes, to monitor the attainment of training targets, a control test
25 is generally made available to the trainee by the computer following the completion of a training
unit. It is normally left to the trainee as to when he then takes this control test. For
convenience, the trainee will take the control test immediately following the completion of the
corresponding training unit while the study material is still present in his short-term memory.
The result of such a control test is not very authoritative in terms of the training success actually
30 achieved. In other words, actual training success only occurs if the trainee has understood the

content of the training course and retains it for a relatively long period of time. This requires the content of the training course to be stored in his long-term memory.

The known CBT processes are shifting the learning process increasingly into the area of responsibility of the trainee. A very high degree of self-initiative, self-discipline and learning ability is demanded of the trainee. It rests with the trainee to ensure that the control test result is authoritative by leaving a sufficient time interval between completing a training unit and taking the control test. However, compared to taking the control test immediately following a training unit, this requires a considerable additional effort on the part of the trainee as he must have actually understood the content of the corresponding training unit and also remember it after a relatively long period of time.

If the result of the control test indicates that the trainee has not understood, or has misunderstood, parts of the training unit, the CBT processes known from the prior art can react in various possible ways. The first possibility consists in ignoring the deficiency and continuing the training course. The trainee can however be advised to re-study the corresponding training unit. This is the worst conceivable option as the training success is extremely poor and the training targets are unlikely to be achieved. Another option consists in presenting the trainee with an additional training unit which repeats the topic of the corresponding training unit which has not been understood or has been misunderstood. These are generally ready-prepared training units which repeat the topic of the corresponding training unit in summarised form. The efficiency of such additional training units is extremely poor as they are not adapted to the individual level of knowledge of the trainee. The additional training units are either based on too great a lack of knowledge on the part of the trainee, in which case they are experienced by the trainee as boring, or are based on too high a level of knowledge, in which case the trainee is overtaxed. In both cases the trainee is likely to discontinue the additional training unit after a short length of time. The efficiency of a CBT process which utilizes the second option is thus extremely poor.

Summary of the invention

According to a first aspect of the present invention there is provided a process for the automatic monitoring by a computer of the attainment of training targets by a trainee in the framework of a training course comprising at least one training unit, comprising the steps of:

- selection of questions from a group of questions by the computer, where the selected questions relate to an area of learning which the trainee is working on in the framework of the training course,

- 5
- creation of a control test by assembly of the selected questions by the computer,
 - the making available of the control test to the trainee by the computer,
 - recording of the trainee's answers to the control test questions by the computer,
 - comparison of the answers with given required values by the computer,

10 - creation by the computer of an additional training unit, taking into account the results of the comparison, if the required values demanded in the framework of the control test have not been attained and

- the making available of the additional training unit to the trainee by the computer.

15 In accordance with an embodiment of the invention, it has been recognised that the efficiency of a training course can be improved in that a control test comprising questions is made available to the trainee by the computer and in that the trainee's answers to these questions are used for the automatic creation by the computer of an additional training unit individually adapted to the level of knowledge of the trainee, which additional training unit is made available to the trainee. During the training course the attainment of training targets by the trainee is monitored by means of the computer.

20 In particular, the following steps are performed in the framework of the process according to an embodiment of the invention. Firstly the computer automatically creates a control test from a group of questions. For this purpose, preferably using a random generator, the computer selects a plurality of questions from the group of questions and assembles the selected questions to form the control test. The group of questions can be stored in a database.

25 The selected questions will obviously relate to an area of learning which the trainee is working on in the framework of the training course.

30 The created control test is made available to the trainee for study purposes. This can take place for example in that the control test is printed out and made available to the trainee in paper form. However, it is also conceivable for the control test to be made available directly to the trainee by electronic means, for example on a display unit of the computer.

Then the trainee's answers to the control test questions are recorded by the computer. This can take place for example in that the answers are given on paper and then input into the computer. However, it is also conceivable for the trainee to input the answers directly into the computer by electronic means, for example via an input unit of the computer.

Then the answers to the control test questions are compared with given required values by the computer. In the evaluation of the answers, different features of the answers (time, score, correct/incorrect) can be taken into account.

Finally, an additional training unit is created and made available to the trainee by the computer if the required values demanded in the framework of the control test have not been attained. The results of the comparison of the answers to the control test questions with the required values are taken into account in the creation of the additional training unit. On the basis of the comparison results, the areas in which the trainee is still deficient in knowledge can be determined. An additional training unit created in this way can be adapted to the individual requirements of each individual trainee. This type of additional training unit neither overtaxes nor undertaxes the trainee. Consequently the likelihood that the trainee will complete the study of the additional training unit is considerably increased. The efficiency of a training course can thus be decisively improved by the process according to the invention.

It is conceivable that the process according to the invention will be called up again some time after the completion of the additional training unit to check whether the trainee has understood and retained the content of the additional training unit. The process according to the invention can be called up for such time until the trainee has actually understood and retained the entire content of a training unit.

In accordance with a preferred embodiment the present invention, it is proposed that the accuracy of the answers to the control test questions are recorded by the computer as first values, and the length of time required by the trainee to answer the questions is stored by the computer as second values, and that the first values and second values are compared with given required values by the computer. These are the decisive values for evaluating the trainee's answers to the control test questions. An adequately precise and authoritative evaluation of the answers can be performed on the basis of these values.

A preferred embodiment of the process proposes that a message is sent from the computer to the trainee telling him to take the control test. This message can appear at any time during the study of the training course. Moreover, the process according to the invention can be

called up by the computer at any time during the study of the training course. It is conceivable, for example, to call up the control test for a specific training unit only some training units later in order to test the trainee's long-term memory in this way. It is also conceivable to combine the questions on several training courses to form one single control test. It is thus possible to test the capability of the trainee also to use the contents of the already studied training units in new contexts and to apply what he has learned.

Advantageously, the message is sent to the trainee in dependence upon given conditions. The given conditions are for example didactic or pedagogic conditions. Such a condition can consist, for example, of sending the message to the trainee at the earliest two days after the completion of a specific training unit to which the control test relates.

In accordance with an advantageous further development of the invention, the process is performed automatically at specified time intervals in the framework of the training course. It is also conceivable to perform the process automatically at specified didactic intervals, i.e. when a specified number of training units have been studied. It can thus be ensured that the content of the training course has also actually been understood and retained by the trainee.

Advantageously, the control test questions are sent to the trainee by electronic mail (e-mail) via a computer network. The trainee's answers to the control test questions are likewise preferably sent to the computer running the process by electronic mail (e-mail) via a computer network.

Alternatively or additionally, it is proposed that the control test questions are made available on a web page of a computer network to which the trainee has access. The trainee's answers to the control test questions are preferably input on a web page and sent from the web page via a computer network to the computer running the process.

In order to motivate the trainee, the results of the comparison of the first values and the second values with the given required values are made available on a web page. All the subscribers to a training course have access to the web page. In this way an important motivation factor of classroom teaching, namely a sense of competition between several subscribers to a training course, is for the first time transferred to a CBT process. The efficiency of a training course can be further improved in this way.

The implementation of the process according to the invention in the form of a control element for a computer is of particular significance. Here the control element stores a program

which can run on the computer and is suitable to execute the process according to the invention. In this case the invention is therefore implemented by a program stored on the control element so that this control element, provided with the program, constitutes the invention in the same way as the process which the program is suitable to execute. An electric storage medium, for example a compact disc (CD), floppy disc or the like, can be used in particular as control element.

According to a second aspect of the present invention there is provided a computer for automatically monitoring the attainment of training targets by a trainee in the framework of a training course comprising at least one training unit, wherein the computer comprises:

- means for selecting questions from a group of questions, where the questions relate to an area of learning which the trainee is working on in the framework of the training course,
- means for creating a control test by assembling the selected questions,
- means for making the control test available to the trainee,
- means for recording the trainee's answers to the control test questions,
- means for comparing the answers with given required values,
- means for creating an additional training unit on the basis of the results of the comparison if the required values demanded in the framework of the control test have not been attained and
- means for making the additional training unit available to the trainee.

The means for selecting the questions from the group of questions preferably comprise a random generator.

In accordance with an preferred embodiment of the invention, it is proposed that the computer comprises:

- means for recording the accuracy of the answers to the control test questions as first values, and the length of time required by the trainee to answer the questions as second values and
- means for comparing the first values and the second values with given required values.

Advantageously, the computer comprises means for sending the trainee a message telling him to take the control test. Preferably, these means consist of means for sending the message in dependence upon predetermined conditions.

In accordance with a preferred embodiment, it is proposed that the computer comprises a
5 database in which the group of questions is stored.

The computer is advantageously linked to a computer network. The computer network preferably has the form of an in-house intranet. Alternatively it is proposed that the computer network has the form of a global computer network, in particular the internet.

Brief description of the drawings

10 A preferred embodiment of the present invention will be explained in detail in the following making reference to the drawing in which:

Figure 1 is a flow diagram of the process according to the invention.

Detailed description of the embodiments

15 In Figure 1 the process according to the invention has been provided with the overall reference symbol 1. The process 1 serves for the automatic monitoring by a computer of the attainment of training targets by a trainee 3 in the framework of a training course. The training course comprises a plurality of training units. At the start of the process 1, in a step 2 questions are selected from a group of questions by means of a random generator of the computer. The group of questions is stored in a database 4. The selected questions relate to an area of learning
20 which the trainee 3 is working on in the framework of the training course.

In a following step 5 a control test is created. For this purpose the selected questions are assembled by the computer.

25 In a further step 6 the trainee 3 is sent a message telling him to take the control test. The broken-line arrow between step 6 and the trainee 3 indicates that a communication takes place between the computer and the trainee 3 at this point.

30 In a following step 7 the control test is made available to the trainee 3. The control test questions are represented for example on the display unit of the computer. The trainee 3 answers the control test questions in a further step 8 of the process 1. The broken-line arrows between steps 7 and 8 and the trainee 3 again indicate a communication between the computer and the trainee 3 in the directions shown.

In a following step 9 the answers of the trainee 3 to the control test questions are compared with given required values. Here preferably the accuracy of the answers to the questions is recorded by the computer as first values and the length of time required by the trainee to answer the questions is recorded by the computer as second values. These first and second values are then compared with the given required values for these values in the step 9.

In a subsequent enquiry 10 it is checked whether the requirements demanded in the framework of the control test have been met, i.e. whether the control test has been passed. If this is the case (yes), the process 1 according to the invention can end at this point.

If however the control test has not been passed (no), in accordance with the present invention an additional training unit is created by the computer in a further step 11. Here the results of the comparison of step 9 are taken into account. The deficiencies in the knowledge of the trainee 3 can be deduced from the results of the comparison. The additional training unit generated in step 11 can thus be individually adapted to the level of knowledge of the trainee 3.

In a following step 12 this additional training unit is made available to the trainee 3 for study purposes. The additional training unit can be made available to the trainee for example on the display unit of the computer. The broken-line double arrow between step 12 and the trainee 3 here indicates an interaction between the trainee and the computer.

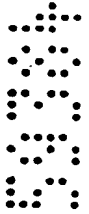
Thereafter, the process 1 according to the invention can be re-run at any time to check whether the trainee 3 has understood and retained the content of the additional training unit and whether he now has understood and retained the whole of the main training unit of the training course. The process 1 according to the invention can be run for such time until the trainee 3 has passed the control test.

The message to take the control test (step 6) can be sent via electronic mail (e-mail). The control test and the additional training unit can be made available to the trainee 3 via a web page to which the trainee 3 has access.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

The foregoing describes embodiments of the present invention and modifications, obvious to those skilled in the art can be made thereto, without departing from the scope of the present invention.

It should be noted that where in the specification or claims the term “comprising” is used
5 that term should be interpreted inclusively rather than exclusively.



Claims

1. A process for the automatic monitoring by a computer of the attainment of training targets by a trainee in the framework of a training course comprising at least one training unit, comprising the steps of:

5 - selection of questions from a group of questions by the computer, where the selected questions relate to an area of learning which the trainee is working on in the framework of the training course,

- creation of a control test by assembly of the selected questions by the computer,

- the making available of the control test to the trainee by the computer,

10 - recording of the answers of the trainee to the control test questions by the computer,

- comparison of the answers with given required values by the computer,

- creation of an additional training unit by the computer taking into account the results of the comparison if the required values demanded in the framework of the control test have not been attained and

15 - the making available of the additional training unit to the trainee by the computer.

2. A process according to Claim 1, wherein the questions are selected from the group of questions by a random generator of the computer.

3. A process according to Claim 1 or 2, wherein the accuracy of the answers to the control test questions are recorded by the computer as first values and the length of time required by the trainee to answer the questions is recorded by the computer as second values, and that the first values and second values are compared with given required values by the computer.

4. A process according to one of Claims 1 to 3, wherein a message is sent from the computer to the trainee telling him to take the control test.

25 5. A process according to Claim 4, wherein the message is sent to the trainee in dependence upon given conditions.

6. A process according to any one of Claims 1 to 5, wherein the process is performed automatically at specified time intervals in the framework of the training course.

7. A process according to any one of Claims 1 to 6, wherein the control test questions are sent to the trainee by electronic mail (e-mail) via a computer network.

8. A process according to any one of Claims 1 to 7, wherein the answers of the trainee to the control test questions are sent to the computer running the process by electronic mail (e-mail) via a computer network.

9. A process according to any one of Claims 1 to 8, wherein the control test questions are made available on a web page of a computer network to which the trainee has access.

10. A process according to any one of Claims 1 to 9, wherein the answers of the trainee to the control test questions are input on a web page, and that the answers are sent from the web page via a computer network to the computer running the process .

11. A process according to any one of Claims 1 to 10, wherein the results of the comparison of the first values and second values with the given required values are made available on a web page.

12. A control element, in particular a compact disc , floppy disc or the like, for a computer on which a program is stored which can run on the computer and is suitable to execute a process according to any one of Claims 1 to 11.

13. A computer for automatically monitoring the attainment of training targets by a trainee in the framework of a training course comprising at least one training unit, wherein the computer comprises:

- means for selecting questions from a group of questions, where the questions relate to an area of learning which the trainee is working on in the framework of the training course,

- means for creating a control test by assembling the selected questions,

- means for making the control test available to the trainee ,

- means for recording the answers of the trainee to the questions of the control test,

- means for comparing the answers with given required values and

- means for creating an additional training unit on the basis of the results of the comparison, if the required values demanded in the framework of the control test have not been attained and

- means for making the additional training unit available to the trainee .

14. A computer according to Claim 13, wherein the means for selecting the questions from the group of questions comprise a random generator.

15. A computer according to Claim 13 or 14, wherein the computer comprises:

5 - means for recording the accuracy of the answers to the control test questions as first values, and the length of time required by the trainee to answer the questions as second values and

- means for comparing the first values and second values with given required values.

16. A computer according to any one of Claims 13 to 15, wherein the computer comprises means for sending the trainee a message telling him to take the control test.

10 17. A computer according to Claim 16, wherein the computer comprises means for sending the message in dependence upon predetermined conditions.

18. A computer according to any one of Claims 13 to 17, wherein the computer comprises a database in which the group of questions is stored.

15 19. A computer according to any one of Claims 13 to 18, wherein the computer is linked to a computer network.

20. A computer according to Claim 19, wherein the computer network has the form of an in-house intranet.

21. A computer according to Claim 19, wherein the computer network has the form of a global computer network, in particular the internet.

20 22. A process for the automatic monitoring of the attainment of training targets by a trainee substantially as hereinbefore described with reference to the accompanying drawing.

23. A computer substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 12th day of November 1999

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ALCATEL

by its attorneys

Freehills Patent Attorneys

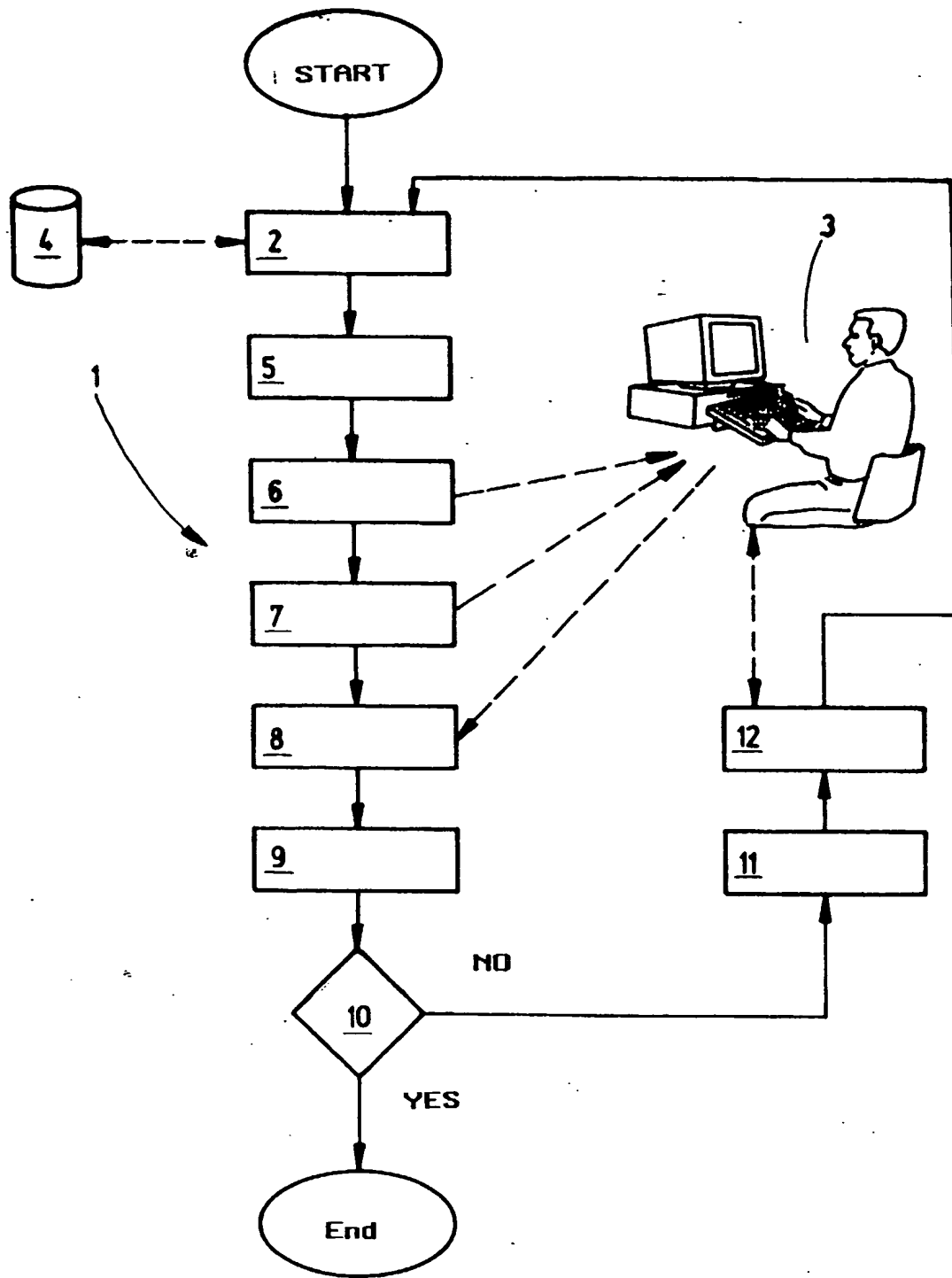


Fig.1